Testimony of
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Federal Energy Regulatory Commission
before the
Committee on Transportation and Infrastructure
United States House of Representatives

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Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to appear before you to discuss the Year 2000 effect on oil

and natural gas transportation. I want to commend you, Mr. Chairman, and the Committee on

Transportation and Infrastructure for holding a hearing on this critical issue. My name is Katie

Hirning, and I am Chief Information Officer (CIO) for the Federal Energy Regulatory

Commission (Commission or FERC). My responsibilities for information technology include

operating and maintaining FERC's internal network and its automated systems, and developing

infrastructure needed for electronic filing, workload processing, and information dissemination. I

also represent the Commission on the President's Council on Year 2000 Conversion, and as a

member of the CIO Council and Small Agency Council.

The President's Council on Year 2000 Conversion (Council) is providing a platform for

government and private industry to work collectively to raise awareness and share solutions for

Year 2000 (Y2K) problems. We at the Commission are working with the Council to foster

outreach and collaboration within the entire energy sector, as well as between the oil and natural

gas trade associations.

We will continue to work closely with the Department of Energy, which is working with the Council on Y2K for the electric industry, to share information between electric, oil and natural gas industries on this vital matter. Chairman Hoecker has also informed the governors of all the states regarding this unified effort to assess readiness for the oil and gas industries, in hopes that state governments can join us as necessary and minimize any duplication of effort.

The oil and natural gas industry is complex and made up of a lot of sectors, which must work together to deliver oil and natural gas across the nation. This involves exploration, drilling and production, processing or refining, storage, and delivery via pipelines, ships, rail cars, or trucks. Electronic communications and transactions are a key component. Consequently, the interface with telecommunications is essential. The oil and gas industry also depend on the banking industry to complete sales transactions.

The oil and natural gas industries represent a significant amount of the energy consumed in the United States, including fuel used to generate electricity. There are differences between the industries. For example, crude oil needs to be refined prior to delivery to the end market. Natural gas can move directly, once processed at the well site to remove impurities. Also, oil needs pumps to move it through a pipeline while natural gas is compressed. However, oil and natural gas often occur together in the same well, and many of the processes and equipment used to deliver the product are similar.

The oil and natural gas industries do not consider the Year 2000 problem to be a competitive issue, and due to the integrated nature of these industries, this has facilitated a very cooperative approach within the sector. Oil and natural gas industry associations have joined with the Commission and other federal agencies to work together under the auspices of the Council to raise awareness and assess Year 2000 readiness across the sector. A list of participating federal agencies and industry associations in the oil and gas sector working group is attached.

Oil and gas sector working group activities have included developing and conducting a survey of the oil and gas industries from well head to gas pump. The American Petroleum Institute and Natural Gas Council, which serve as umbrella groups for the working group, compiled and aggregated survey responses, which were presented at a technical conference recently held at FERC on September 18, 1998. Survey results were also posted on a website developed by the oil and gas sector working group, which is part of the Council's website (www.y2k.gov).

Respondents to this survey represent, by volume, about two thirds of oil and gas consumption. While we consider this level of response to be respectable for the initial survey, the oil and gas working group will continue its efforts to have an even higher level of response for future surveys. Over 70 percent of the survey respondents were smaller companies; nonetheless this reflects only a sampling of smaller companies. However, while smaller companies are much more numerous than large ones, collectively they account for only a small volume of oil and gas consumption. While there is an impression from anecdotal information that smaller companies are

not paying attention to the Y2K problem, the oil and gas survey results indicate that many are working diligently towards achieving Y2K readiness.

The first survey question asks if company Y2K plans prioritize hardware, software, and embedded systems according to mission critical functions. Eighty five percent of those responding included prioritization in their plan. Over three quarters of the plans include: (1) testing; (2) supply team coordination with other companies, local emergency organizations, local governments, and other organizations that can impact mission critical functions, and (3) include supporting infrastructure such as facilities, emergency response systems, and vehicle fueling. About three quarters of the respondents indicated that all appropriate company people are aware of Y2K issues and their role in assuring readiness, and that they have communicated with business partners, local government, and the public about their Y2K plan and programs.

The survey also asked questions about contingency planning. The industry's first focus is on fixing problems. If a fix cannot be guaranteed, contingency planning begins. Survey results indicate that the industry is in the process of fixing problems, and has begun developing contingency plans, with the primary focus on operations.

Items included in company contingency plans include operations, production, processing, manufacturing, loading, transportation, distribution services for liquids, communications, utility and supporting services, administrative services, human resources, financial, accounting, and billing functions, security and emergency response procedures, and environmental monitoring and

control. About a third of the respondents who provided a date indicated that they expect their contingency plans to be ready by the end of this year, three quarters by June 1999, and all by December 1999.

Survey questions also addressed business systems and associated software for administrative functions such as billing, accounting, and so forth. Responses regarding Y2K readiness as of September 1998 addressed: (1) planning an approach and setting up an implementation structure; (2) conducting an inventory of potentially affected systems; (3) assessment through contacting vendors and suppliers; (4) remediation, which includes testing and repairs; and (5) validation, which includes checking that everything works together as well as ensuring that individual components work. Survey results indicate that over half the respondents are either in the assessment or remediation phase, with over a third in remediation.

Survey participants provided similar information on embedded systems, which are found in industry operations that move oil and gas along, processing it and so forth. Survey results indicated that operations lags somewhat behind the software side, largely because companies started working on mainframe and software systems used for business processes as many as five years ago. Consequently, the focus has now shifted to embedded systems that are more prevalent in system operations.

Industry-wide, addressing embedded systems is largely in the assessment and remediation phase, although there are fewer companies in the remediation phase compared to business

systems.   While only one quarter of respondents who provided a date expected to be in the

validation phase by December 1998, three quarters expect to be completed by June 1999, and 100

percent by December 1999. Given 14 months to go, the industry feels comfortable that they will

reach the validation phase in time to ensure Y2K readiness. No one can guarantee one hundred

percent compliance for every system. While industry representatives acknowledge that there is

still a lot of work that remains to be done, the industry in general is working together to finish the

job in time.

Industry representatives emphasized that there is a large amount of very detailed data that

is behind the numbers reflected in the industry survey results, which give a comprehensive look at

industry systems. The industry is generally moving through assessment and remediation, where

they are now, towards validation. Succeeding surveys are anticipated to show that the industry as

a whole is, in fact, progressing towards Y2K readiness.

Industry representatives also emphasized the value of continued cooperation between

industry participants and government. They stressed the need for oil and gas sector participants

to take a step towards creating a more formal joint program with both the telecommunications

and electric industry, which are crucial components that support the functioning of the sector, and

because of the reliance of the electric sector on oil and gas to generate power. The industry also

relies on the transportation sector, from rail, to truck, to ship, and are concerned with how this

sector is doing. They also expressed a need to reach out to the states and internationally, as the

large companies, in particular, are multinational. This is an area where the Commission can facilitate dialog and coordination through the Council and we are taking steps to do so.

The industry associations plan to conduct the next survey in February 1999. Some questions may be modified to better capture the information the group is seeking to assess readiness. The industry representatives emphasized that they plan to continue to share what they have learned with other companies and help the others come along with those who started earlier. As Mr. Quiggins of Shell stated ". . . as we work together, we don't believe in re-inventing the wheel . . and we do, in fact, use our task force meetings to help the other companies come along. So we share our learning openly and we're going to continue to do that".

We agree with John Koskenin that the survey gives us an important benchmark from which to start, that we are making progress, but we still have a long way to go. It is important to continue to increase the level of cooperation and information sharing, and to be as transparent as we can with the public. We must acknowledge that not every single system will not be ready in time, but we must also inform the public that contingency plans are being made to address these concerns.

John Koskinen reaffirmed the Council's commitment to provide more communication and coordination across sector lines, and to organize joint working group meetings in coordination with the oil and gas sector working group, which he referred to as the Council's best example of a successful working group.

In addition to understanding the aggregated oil and gas industry survey results, the Working Group sought industry-specific evaluations of readiness. Investor-owned local gas distributors were represented at the conference by the American Gas Association (AGA), which represents the end user point of the process. Residential consumption comprises about 25 percent of local gas distribution, while commercial accounts for 15 percent, industrial 44 percent, and electric utilities 16 percent. Survey results from these local gas distributors were very similar to the aggregate results described above.

Most investor-owned local gas distributors are in the later stages of remediation and testing for business software, while many are in the assessment stage for embedded systems. They have found evaluating embedded systems to be very labor intensive due to the shear volume of embedded chips and processors involved in all stages of operations. Supervisory control data acquisition (SCADA) systems are the most prevalent mission-critical systems with embedded systems. Large increases in the validation phase are expected to occur as we move forward. Gaining compliance commitment from vendors and ensuring upstream and downstream business partners' Y2K readiness were cited by AGA as two of the greatest obstacles facing the industry.

The municipal local gas distributors, or public gas systems, were represented at the conference by the American Public Gas Association (APGA). APGA considered the results from the survey as being quite positive in demonstrating that small entities and municipal gas systems are working toward achieving Y2K readiness. The survey results indicated that about 50 percent

of the respondents are close to achieving readiness today, and that the remaining are working on their plans, including contingency planning.

According to APGA, many of the smaller municipalities have mechanical and manual equipment and never installed the more sophisticated electronic equipment. This appears to be the underlying reason why so many companies indicated that they have already achieved readiness. Public utilities must also coordinate with the municipality in achieving Y2K readiness, and according to APGA, municipalities are also moving ahead with addressing Y2K issues. APGA, like AGA, expressed a concern regarding third party suppliers.

Interstate natural gas pipelines were represented at the conference by the Interstate Natural Gas Association of America (INGAA). INGAA pointed out that unlike the electric grid, the natural gas distribution and transmission system has some storage built into it. Consequently, as gas is pushed up to market, is compressed, and goes into built-in storage, natural gas transmission is less of a real-time system compared to moving electrons along a transmission line.

Individual plants are located along pipelines that deliver gas from the producing areas. These plants can operate independently, but a distributed control system (SCADA) is required to provide communications in order to operate the system efficiently. So, there are concerns regarding the readiness of the telecommunications sector.

The gas pipelines have a lot of equipment that is mechanical rather than electronic, such as relief valves, springs, and compressors. Natural gas is commonly used to power the engines that compress the gas, and companies maintain auxiliary generation as well. While these systems do not necessarily require electricity to operate, INGAA acknowledges that there are a lot of interdependencies that must be identified. INGAA indicated that the industry has been working hard on the embedded chips associated with operations and has also been involved in some contingency planning. Further, the industry is set up to contend with emergencies such as hurricanes and snowstorms, although they realize that Y2K is a different type of event.

INGAA described the priorities of the gas pipeline industry as: (1) public safety; (2) delivering the product to the customer; (3) correctly accounting for price and delivery of the product; and (4) ensuring that internal business systems such as payroll are functioning properly.

The Gas Industry Standards Board (GISB), which is made up of all segments of the natural gas industry, assured conference participants that the standards that GISB has been creating are Y2K compliant, including electronic standards. Overall, GISB's concern is testing of their standards. Gas marketers, a fairly new segment, are heavily dependent on electronic systems and information systems, and so must be cautious in ensuring that their systems are compliant. However, they do not have some of the manufacturing issues that other segments must address. While gas marketers were not represented directly at the conference, the Petroleum Marketers Association of America is a member of the working group and participated in conducting the survey.

The Independent Petroleum Association of America (IPAA) represents the independent exploration/production companies that operate in 33 states. IPAA's membership tends to include a high percentage of smaller companies. Survey results compiled by IPAA were generally very representative of the overall aggregate survey, where the mid-size and large companies tend to be well on their way in evaluating and correcting Y2K problems. The concern has been with the smaller companies. Many of the smaller independent exploration/production companies have 20 employees or less, so they rely on third party providers for their software. Consequently, they have to work with these third party providers to develop solutions.

On the operations side, the majority of systems are mechanical. Because natural gas in the reservoir is pressurized, it will flow to the surface without any mechanical means. Oil is pressurized to begin with, but additional mechanical means are needed to operate crude oil wells. Oil then requires pumps to move it. These pumps are typically powered by gasoline engines. Natural gas and electricity are also used for pumps in the field. As a result, this segment is also concerned with its interdependency with other sectors. The telecommunications sector is especially critical for mid-sized and large companies that use remote sensing and remote metering.

A representative from Shell commented on the exploration and production portion relative to large companies, which are largely looking at the problem of lost production. So far, they have not found any safety-related difficulties related to potential Y2K failures. There has been widespread information sharing among the large producers. For example, in some areas such as the North Sea, Shell and Exxon have worked together to address Y2K issues affecting a group of

off-shore platforms where they expect the complete operation to be compliant by the end of the year.

Large off-shore production wells begin with process control activities that work their way up into a distributed control system. On a platform, all operations can be monitored and controlled from a central spot. Ten different problems were identified and corrected for platforms located in the North Sea. These problems included metering and monitoring systems. This experience gained in the North Sea is now being applied in the Gulf of Mexico and other sites. Consequently, good progress has been made in the large companies' exploration and production activities off-shore.

Telecommunications is vital for off-shore production platforms. Many of the fixes for Y2K involve upgrading telecommunications systems. Because off-shore production platforms are typically subjected to major storms or hurricanes, there is an even greater focus on emergency preparation that there might typically be on-shore.

The oil pipeline industry was represented at the conference by the Association of Oil Pipe Lines (AOPL). Oil pipelines are basically buried tubes that use (1) pumps to generate centrifical force to move oil down the pipeline, and (2) gates, in the form of valves, to let the product in and out of the tube. Pipelines carry crude oil from the field, or from ports if it's being delivered by tanker, to the refinery. Pipelines then carry the refined product from the refinery, or sometimes from ports, to the distribution points for further transportation by truck, barge, or train to the end

user. Occasionally deliveries of jet fuel are made directly to airports for further distribution into the airplanes.

According to AOPL, the pipeline companies have been doing extensive work on their operations and SCADA systems. Oil pipelines, like natural gas pipelines, control the flow of oil by using SCADAs. The SCADA communicates remotely with various components on the system. SCADA use embedded processors for monitoring and controlling the pipeline's pumps and valves. Results so far indicate that the vast majority of the embedded processors used for monitoring and controlling of the pipelines do not have date clocks.

The oil pipeline industry has been regulated by the federal government for over 100 years, and in the past oil has been moved by purely mechanical means. Of course these systems have been modified over the years to incorporate some electronics. However, the embedded processors that do not have date clocks are essentially unaffected by Y2K. Most do not have magnetic storage, so any data recording would not be a problem either.

The oil pipeline companies have worked for a number of years on SCADA systems. According to AOPL, most of the equipment has been replaced and/or software has been rewritten. The survey indicated that now, many of the companies are focusing on embedded processors, and are in the process of testing, revising, and replacing embedded processors as necessary. Companies are continuing to work with suppliers.

The current focus by oil pipeline companies is on external systems, especially telecommunications, because of the remote control of their systems, and with electricity because some pipeline pumps are powered by electricity. Almost all pipelines have back-up SCADA systems. Some even have local control systems and many have back-up generation. Many of the embedded processors are relatively low voltage and have battery enhancement that permit them to run even without direct electricity.

Oil pipeline companies have to deal with various natural disasters on a regular basis, including power failures. Consequently, contingency plans are in place and are being reviewed extensively and expanded to try to encompass potential Y2K problems. While AOPL acknowledges that there is still a lot of work to be done, they believe the industry is moving along at the appropriate pace, and fully expect the industry to be ready by the new millennium.

Oil pipelines bring oil to refineries as well as delivering refined products. Oil refineries go through numerous steps to take crude oil and refine it into various products such as gasoline, heating oil, and jet fuel. Refinery equipment includes heat exchangers and large crackers that are automated and controlled by electronics. Embedded systems occur in the process control activities. While these compilers are generally not a problem, date-sampling begins after the data from the instrumentation is compiled. Dates are processed through the refinery. For example, maintenance systems need to know when things were last checked, and if the date is wrong, it can cause the system to shut down.

Oil refineries are generally operated 24 hours a day, so it is difficult to take them off line and test them like you could with a software program. Occasionally a refinery is shut down for extensive routine maintenance. This is when testing for Y2K is done. Oil refineries also have an additional complication due to the number of mergers that are currently taking place as the market place is becoming more competitive. Senior managers turn their focus to corporate restructuring which can cause the Y2K effort to go into a pause mode. This illustrates the point that there can be circumstances that affect Y2K readiness that are not directly related to a mechanical fix or contingency plan.

Natural gas also goes through a processing phase. The Gas Processors Association (GPA) participated in the conference to discuss gas processing and gathering, which is one of the primary stages of getting gas to the consumer. This involves gathering gas from wellheads and processing it into merchantable natural gas to push along pipelines to get the gas from Point A to Point B.

According to AGA, the primary concern of gas processors, gatherers, and small refineries, are the control systems for the facilities due to the extensive number of embedded chips. These chips are used in flow control valves and metering. Problems with embedded chips can create accounting issues, including buying, selling and trading of gas products. Survey results indicate that these companies are generally working on remediation and developing contingency plans.

The success of the Council's oil and gas sector working group technical conference is a clear indication that cooperation and collaboration is actively occurring between the federal government and industry, and intra-industry. Survey results indicate that while there is still much to do, the industry is well on its way to achieving readiness. The Chairman remains committed to supporting the Council and sponsoring the oil and gas sector working group.

Members: Oil and Gas Sector Working Group

<u>Government Members</u>

◇ President's Council on Year 2000
◇ Federal Energy Regulatory Commission
◇ General Services Administration
◇ U.S. Department of Energy
◇ U.S. Department of Interior
◇ U.S. Department of State
◇ U.S. Department of Transportation/OPS

<u>Industry Associations</u>

◇ American Gas Association
◇ American Petroleum Institute
◇ American Public Gas Association
◇ Association of Oil Pipelines of America
◇ Australian Institute of Petroleum
◇ Canadian Association of Petroleum Producers
◇ Canadian Energy Pipeline Association
◇ Defense Energy Support Center
◇ Distributed Power Coalition of America
◇ Gas Industry Standards Board
◇ Gas Processors Association
◇ Gas Research Institute
◇ IEA International Centre for Gas Technology Information
◇ Independent Petroleum Association of America
◇ Interstate Natural Gas Association of America
◇ Interstate Oil and Gas Compact Commission
◇ National Association of Regulatory Utility Commissioners
◇ National Petrochemical & Refiners Association
◇ National Propane Gas Association
◇ National Regulatory Research Institute
◇ Natural Gas Council
◇ Natural Gas Supply Association
◇ Petroleum Marketers Association of America
◇ Petroleum Technology Transfer Council
◇ U.K. Off-shore Oil Association